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A taxonomic revision and revalidation of *Nycterilampus* Montrouzier (Coleoptera: Elateridae, Agrypninae)

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Abstract

Nycterilampus Montrouzier, 1860, from Oceania, is removed from junior synonymy with *Tetrigus* Candèze, 1857, and is redescribed and revalidated. The genus includes two species, *N. lifuanus* Montrouzier, 1860, and *N. velutinus* Fleutiaux, 1891 both from New Caledonia. A comparative study of the morphological characters of males and females, including the reproductive organs of the *Nycterilampus* species and *Tetrigus parallelus* Candèze, 1857 (type-species) is presented. A key to *Nycterilampus* species and their separation from *Tetrigus parallelus* is given.

Key words: Australian Region, New Caledonia, Hemirhipini, Ludiinae, *Nycterilampus*, *Tetrigus*

Introduction

Nycterilampus was characterized by Montrouzier (1860) based on *N. lifuanus* from Lifu Island. Fleutiaux (1891) transferred *Ochosternus gigas* Candèze, 1881 from New Caledonia to *Nycterilampus*, redescribed it, added *N. velutinus* to the genus, and provided a key to the three species. Following Candèze (1881) he also placed *Nycterilampus* in "Ludiidae". In 1904 Fauvel accepted *N. lifuanus* and *N. velutinus* as valid species but considered *N. gigas* a synonym of *N. lifuanus*; he also placed the genus in the tribe Ludiini. In the 1927 Schenkling's catalog the two former species were considered valid and the genus was still placed in the Ludiinae.

In the checklist of the elaterids from Oceania Van Zwaluwenburg (1932) synonymized *Nycterilampus* with *Tetrigus* Candèze, 1857. Fleutiaux (1947) characterized the genus *Tetrigus* and agreed with Van Zwaluwenburg (*l. c.*) about his synonymy, redescribed the type species of *Tetrigus* (*T. parallelus* Candèze, 1857) and placed it in the Hemirhipinae. Casari-Chen (1993) listed 21 species, redescribed *T. parallelus* based on the type specimen, removed *Tetrigus* from the Hemirhipini and considered it as a genus of the Agrypninae (= Pyrophorinae) pointing out that it could be an intermediary group between Hemirhipini and Pyrophorini.

We studied identified specimens of *N. lifuanus, N. gigas* and the types of *N. velutinus*, and accepted that *N. gigas* is a synonymy of *N. lifuanus*. The data for *Tetrigus parallelus* was taken from Casari-Chen (1993). These species share the Agrypninae synapomorphies (Calder *et al.,* 1993): presence of one seta arising basally from the outer flat portion of each tarsal claw (Fig.16) and hind wing without wedge cell (Fig. 17).

The material examined belongs to J. Chassain (Thomery, France) and to the following institutions: Muséum National d'Histoire Naturelle, Paris (MNHN), The Natural History Museum, London (BMNH), Museu de Zoologia, Universidade de São Paulo, São Paulo (MZSP) and Institut Royal des Sciences Naturelles de Belgique, Bruxelles (IRSNB).

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Nycterilampus Montrouzier, revalidated

Nycterilampus Montrouzier, 1860: 258 (original description); Fauvel, 1904: 132; Hyslop, 1921: 658. (type species: *Nycterilampus lifuanus* Montrouzier, monotypic); Schenkling, 1927: 478 (cat.).
Nycterolampus Fleutiaux, 1891: 391 (misspelling); Schwarz, 1906: 254, 282; Schenkling, 1927: 478 (cat.).

Redescription. Male. Body about 3.9 times longer than wide, weakly convex. Vestiture consisting of fine, short, dense and semidecumbent yellowish setae, longer on metaventrite, covering the color of the integument. Head convex, with a small longitudinal carina at base; frontal carina complete. Antenna 11 or 12 segmented (Figs. 2, 4) serrate or pectinate from antennomere IV. Mouthparts directed anteroventrally. Mandibles bidentate; maxillary palps with 4 articles, apical article securiform; labium with prementum and mentum well sclerotized, labial palps with 3 articles, last article securiform.

Prothorax (Figs. 7–9) parallel sided, lateral margins entirely carinate, hind angles produced and carinate, divergent, anterior angles small, rounded. Pronotum with a pair of glabrous and shiny median lateral spots. Prosternal lobe produced and with two lateral spines; prosternal process horizontal with preapical tooth. Scutellum (Figs. 10, 11) pentagonal and abruptly elevated above the level of mesoscutum.

Mesoventrite (Figs. 12–13) with posterior area marginated and steeply declivous to anterior borders. Mesoventral cavity deep, parallel sided, borders narrowing abruptly between the mesocoxae, floor of cavity with an elongated, narrow and shiny median band, without golden setae; mesocoxal cavity open to both mesepimeron and mesepisternum; meso-metaventral suture distinct.

Hind wing (Fig. 17) about 2.5 times as long as wide; radial cell about 5 times longer than wide with proximal, posterior angle obtuse; r_3 0.3 times total length of radial cell; r_4 vestigial; CuA_1 cross–vein-like, between MP_{3+4} and CuA_2; apical area bearing a triangular sclerotization posteriorly to the radial cell and two narrow, elongated, oblique and convergent sclerotizations at base; medial area with 5 free veins (MP_3, MP_4 + CuA_1, CuA_2, CuA_{3+4} + AA_{1+2} and AA_{3+4}); wedge cell absent.

Tibia compressed laterally, apices with two small and subequal spurs and a row of spiniform setae on outer and inner margins; tarsomeres simple, ventrally pilose; apex of tarsomeres 1–3 bearing a row of lateroventrally spiniform setae; tarsomere 1 longer than 5, shorter than 2–4 combined; 2+3 shorter than 1; 2 longer than 3; 4 shorter than 3. Tarsal claw (Fig. 16) simple bearing one long seta at base arising from the outer flat portion; empodium sclerotized with two strong short setae.

Female. Longer than male and more convex. Antenna 11 or 12 segmented and serrate (Figs. 3,5). Baculi 3.7–4.0 times longer than coxites and bursa copulatrix without inner spines.

Discussion. Van Zwaluwenburg (1932) in a footnote mentioned that *Nycterilampus* should be a synonym of *Tetrigus*. In his paper on New Caledonian elaterids Fleutiaux (1947) accepted that synonymy.

Comparing our specimens with the characters of *T. parallelus* in the paper by Casari-Chen (*l. c.*), we noticed that *Nycterilampus* differs from *Tetrigus* (sense strict) by: frons with complete carina; mandibles bidentate, anterior prosternal lobe with a blunt spine on either side (Fig. 9), tibiae with two small and subequal apical spurs; apices of parameres securiform (Figs. 24, 25); baculi 3.7–4.0 times longer than coxites (Figs. 29, 30); bursa copulatrix without inner spines. In *Tetrigus parallelus*, the mandibles are unidentate, anterior prosternal lobe without spines on either side, ventral parameres separated at base and baculi about 10.0 times longer than coxites. Although, our study does not include a cladistic analysis, these characters seem to be sufficient to indicate that *Nycterilampus* form a distinct monophyletic lineage and should be considered as a valid genus.

It is possible that other species of *Tetrigus* can be transferred to *Nycterilampus*, for instance, *T. fleutiauxi* Van Zwaluwenburg, 1933 from Ongea-ndriti, Ovalau, Kandavu, Viti Levu whose characters mentioned in the literature (Johnson 2001) are appropriate with those of the genus *Nycterilampus*. However a complete revision of all *Tetrigus* species is necessary before that change is made. Therefore we restricted the present work to the two original species of *Nycterilampus*.

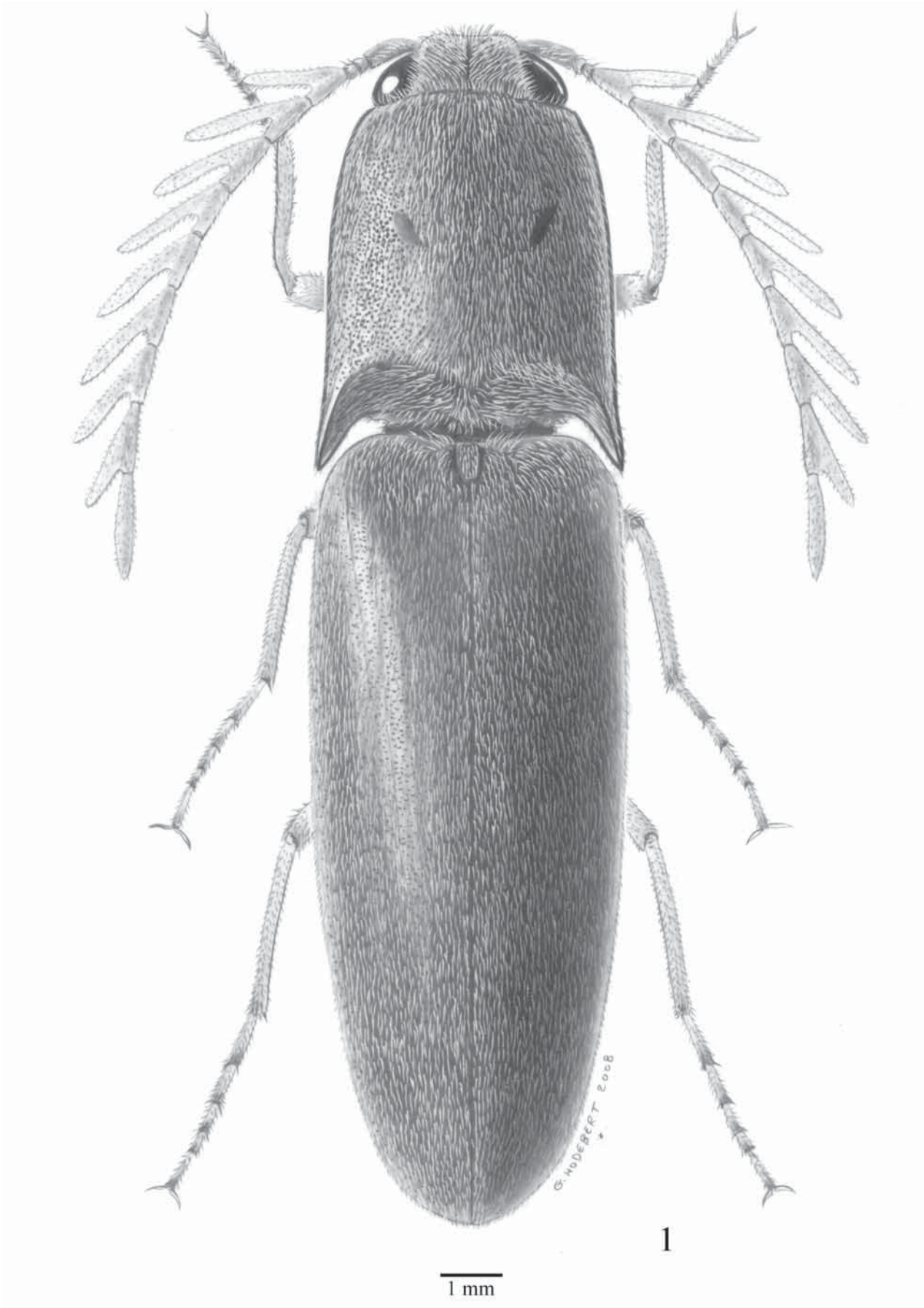


FIGURE 1. *Nycterilampus velutinus* Fleutiaux, 1891. Male habitus.

In order to better clarify the differences between *Tetrigus parallelus* and *Nycterilampus* as well as the *Nycterilampus* species we present the following key:

A key to *Tetrigus parallelus* and *Nycterilampus* species

1. Frons with incomplete carina; mandibles unidentate; anterior prosternal lobe without a blunt spine on either side; tibiae without apical spurs ..... *Tetrigus parallelus* Candèze
- Frons with complete carina; mandibles bidentate (Fig. 6); anterior prosternal lobe with a blunt spine on either side (Fig. 9); tibiae with two apical spurs *Nycterilampus* Montrouzier. 2
2. Antennae 11–segmented (Figs. 4, 5) serrate; ventrites (Fig. 23) with a pair of polished, shiny and lateral spots near the anterior angles ..... *Nycterilampus lifuanus* Montrouzier
- Antennae 12–segmented (Figs. 2, 3) pectinate; ventrites without spots near the anterior angles .... *Nycterilampus velutinus* Fleutiaux

***Nycterilampus lifuanus* Montrouzier, 1860**
(Figs. 4–6, 8–25, 27–30)

Nycterilampus lifuanus Montrouzier, 1860: 258 (type–locality: Lifu Island, New Caledonia); Candèze, 1863: 74; Fauvel, 1904: 132; Schenkling, 1927: 478; Van Zwaluwenburg, 1932: 23
Nycterolampus lifuanus Fleutiaux, 1891: 392 (misspelling); Schenkling, 1927: 478 (cat.)
Ochosternus gigas Candèze, 1881: 105 (type-locality: New Caledonia); Schenkling, 1927: 478 (cat.)
Nycterolampus gigas; Fleutiaux, 1891: 393 (misspelling); Schenkling, 1927: 478 (cat.)

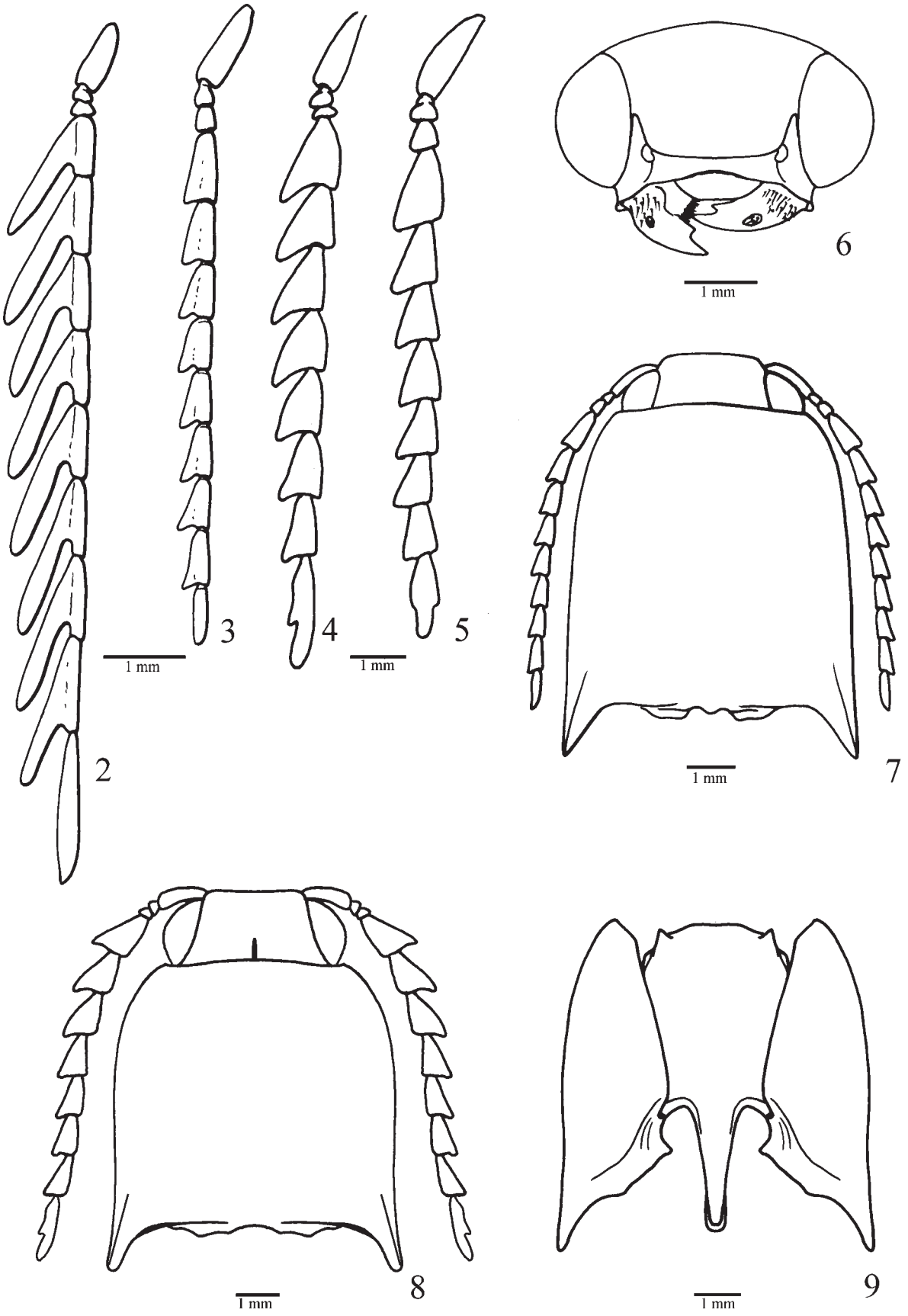
Redescription. Male. Length 25.0–32.0 mm. Integument black, except for: red-brown sublateral stripes on the pronotum; hypomera red-brown with lateral margin darker; legs and antennae brown. Head length 2.1 mm, prothorax length: 6.0 mm, prothorax width: 6.5 mm, elytral length: 16.5 mm, humeral width: 6.0 mm.

Head (Fig. 6, 8) punctation fine, dense and umbilicate; gena well developed with a groove for reception of the scape. Index of eye prominence 0.4. Antenna 11-segmented (Fig. 4), short, not exceeding the posterior angles of pronotum; serrate from antennomere IV, antennomeres II and III very short and subequal, antennomere IV 7.0 times longer than antennomere III. Labrum semi-elliptic, narrow (4.7 times wider than long). Mandibles each with a subcircular pit on external border. Frontoclypeal region raised, then declivous to base of labrum, 4.6 times wider than long.

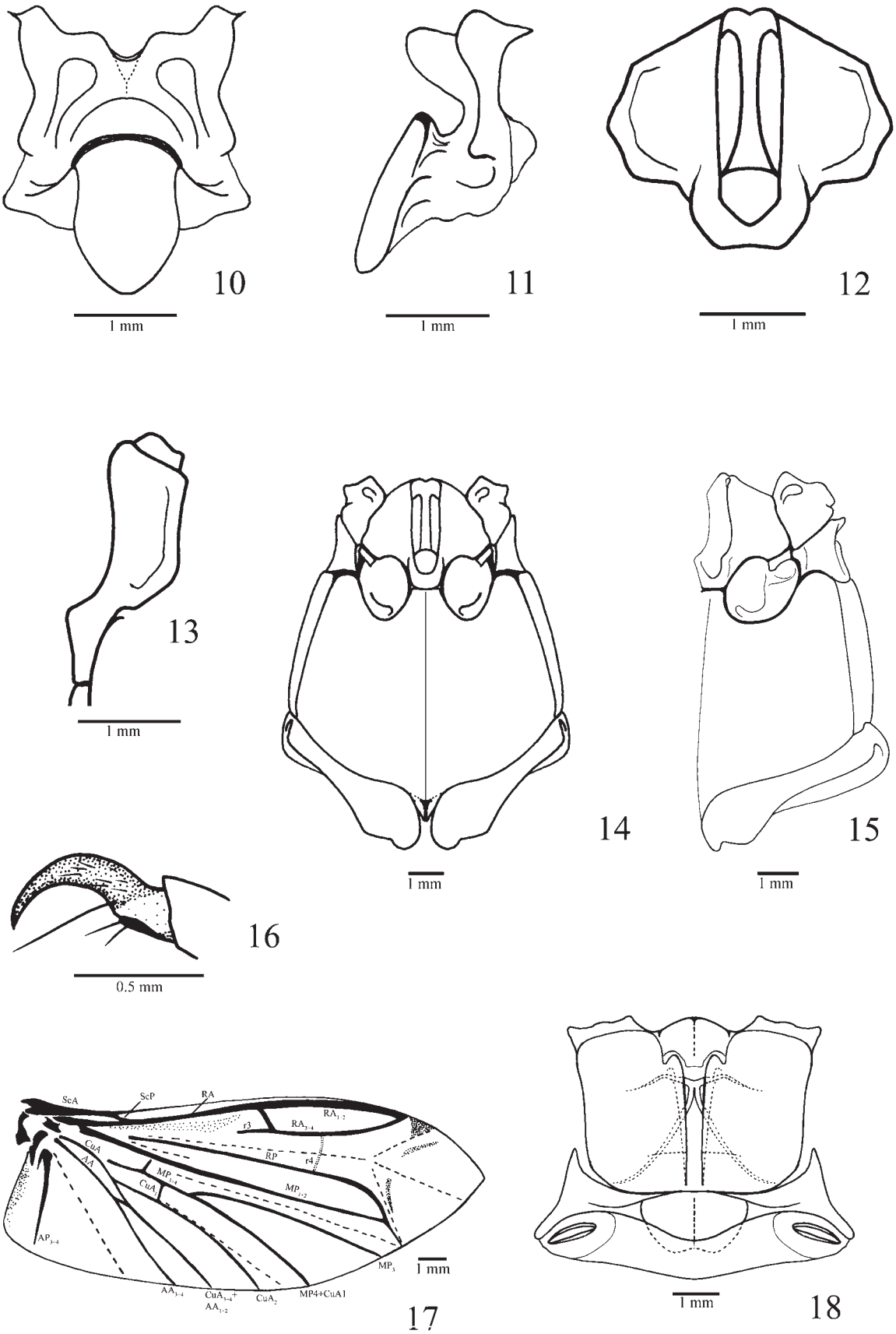
Prothorax (Figs. 8–9) 0.97 times as long as wide. Pronotal punctation medium and moderately dense on disc; fine, dense and umbilicate on sublateral, anterior and posterior margins; strong, dense and umbilicate close to lateral carina. Prosternum elongate, marginate around procoxae, prosternal sutures straight, apex shortly open, punctures strong and sparse on median line, dense on posterior and lateral margins. Prosternal process (Fig. 9) horizontal, with subapical tooth and 4.6 times as long as the procoxal cavity width; prosternal process with fine and sparse punctation between procoxae, almost glabrous posteriorly. Anterior margin of hypomera obliquely truncate, entirely punctate except for the femur rest area, punctation fine, dense and umbilicate. Scutellum (Figs. 10–11) pentagonal.

Elytra 2.8 times longer than pronotal length. Elytral striae weakly impressed; interestriae with punctation very fine, dense and rasp-like; apices acuminate and divergent with a small sutural spine. Epipleura tapering to metacoxal plate.

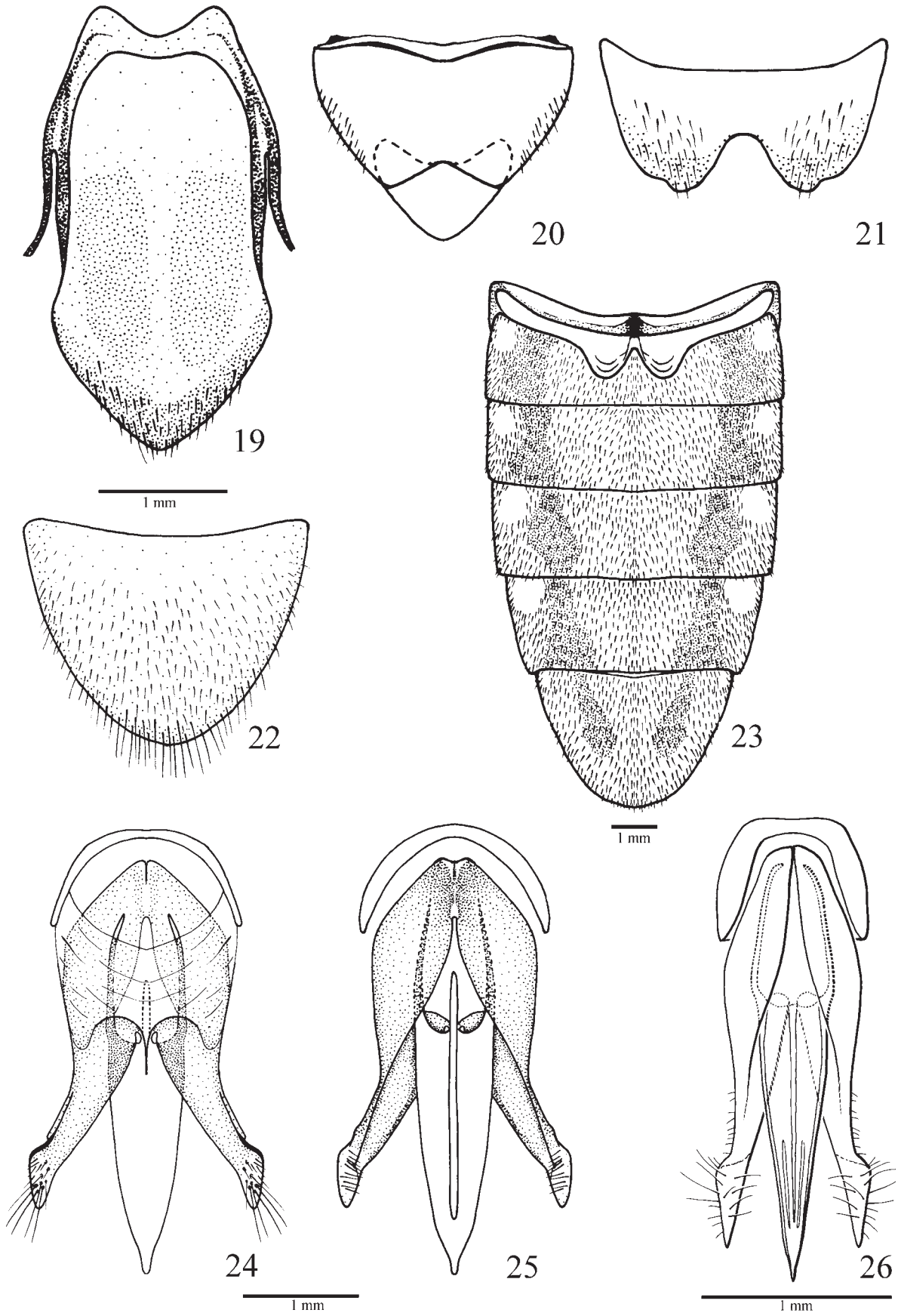
Mesoventrite (Figs. 12–14) finely, densely punctate. Metaventrite (Figs. 14–15): with punctation fine, dense, rasp-like, except for the median line with punctation larger and dense; discrimen extending along all metaventrite length. Metacoxal plate oblique (about 32º to the body transversal axis), its inner half about 2 times wider than outer half; posterior outer angle rounded. Metanotum (Fig. 18) with a longitudinal apodema at the median posterior area.



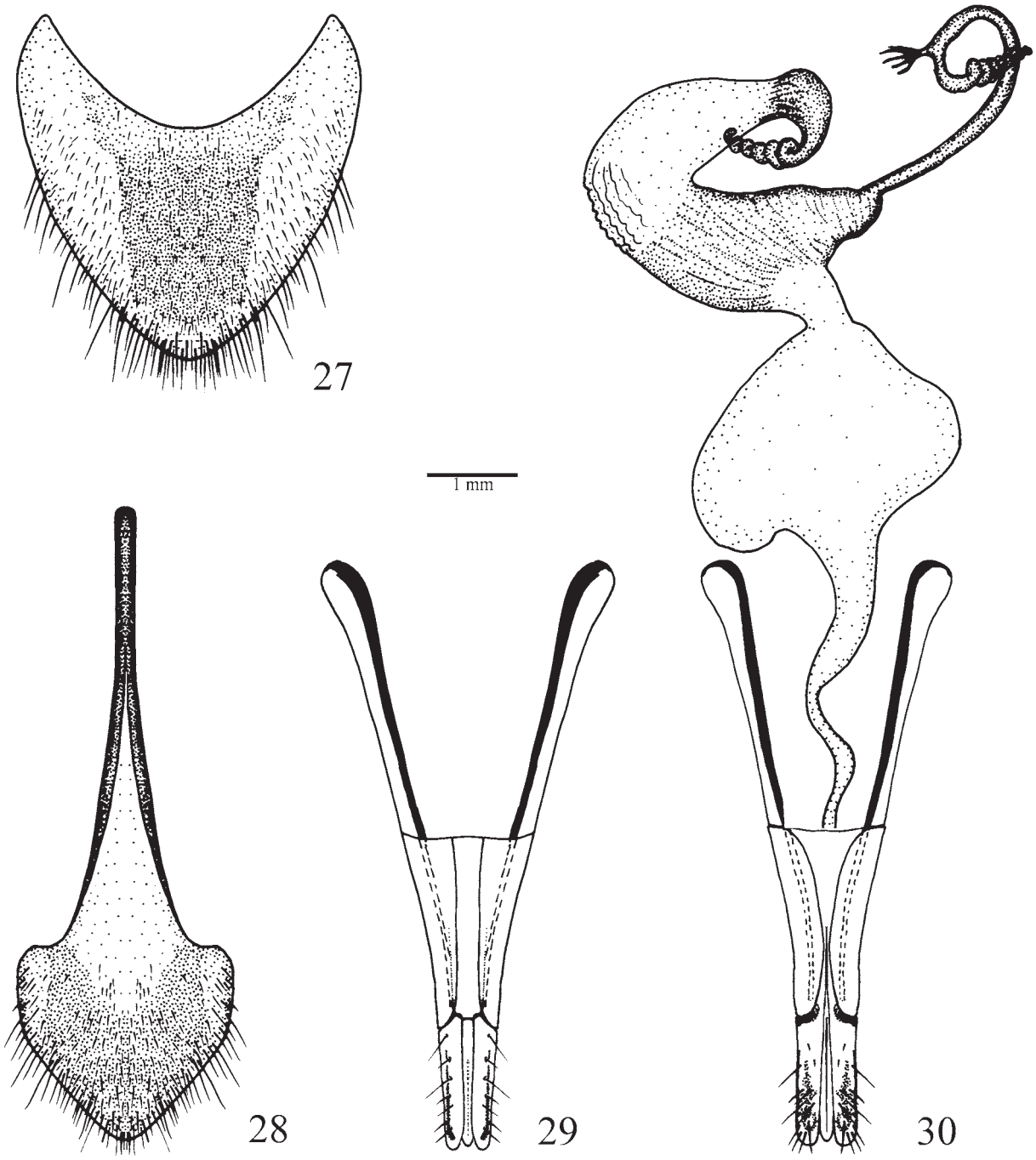
FIGURES 2–9. *Nycterilampus velutinus* Fleutiaux, 1891. 2, 3, antennae (male, female); 7, head and pronotum (female). *N. lifuanus* Montrouzier, 1860. 4, 5, antennae (male, female); 6, head; 8, head and pronotum (dorsal); 9 prothorax (ventral).



FIGURES 10–18. *Nycterilampus lifuanus* Montrouzier, 1860 (male). 10, 11, mesoscutum and scutellum (dorsal, lateral); 12, 13, mesoventrite (ventral, lateral); 14, 15, pterothorax (ventral, ventro–lateral); 16, tarsal claw; 17, hind wing; 18, metanotum.



FIGURES 19–26. *Nycterilampus lifuanus* Montrouzier, 1860 (male). 19, sternite IX; 20, tergites IX – X; 21, sternite VIII; 22, tergite VIII; 23, abdomen (ventral); 24, 25, aedeagus (dorsal, ventral). *N. velutinus* Fleutiaux, 1891 (male). 26, aedeagus (ventral).



FIGURES 27–30. *Nycterilampus lifuanus* Montrouzier, 1860 (female). 27, tergite VIII; 28, sternite VIII; 29, ovipositor (ventral); 30, ovipositor and reproductive organs (dorsal).

Abdomen (Fig. 23) with punctation fine, dense, rasp-like, except for the median line with punctation larger and dense. Ventrites I–IV with a pair of polished, shiny and subquadrangular lateral spots near the anterior angles; ventrite V with a very small one. First sternite membranous, more sclerotized at middle, forming a small sclerite produced and compressed laterally. Tergite VIII (Fig. 22) evenly weakly sclerotized, semielliptical, almost straight at base, clothed with fine and short setae, longer on posterior and latero–distal borders; sternite VIII (Fig. 21) partially membranous with posterior margin bilobate, each lobe slightly emarginate postero-laterally and bearing short setae; sternite IX and tergite IX (Fig. 20) fused basally, sternite IX (Fig. 19) elongate, marginate at base and pointed to apex, basal third with two elongated lateral areas and posterior margin more sclerotized, apex bearing short setae. Tergites IX and X (Fig. 20) partially fused, tergite

IX with anterior margin sinuous, sides rounded and posterior margin bilobate; tergite X (Fig. 20) subtriangular, with anterior margin emarginate.

Aedeagus (Figs. 24–25) with phallobase narrow, connected to parameres by a transparent membrane; parameres shorter than penis, with ventral surface almost 2 times longer than dorsal one, partially fused ventrally at base, articulated to penis dorsally, apices short and securiform, bearing setae of various size, longer on dorsal surface; ventral sclerite of penis elongate, very narrow, parallel–sided; dorsal sclerite tapering to apex, with basal struts 0.4 times total length of dorsal sclerite.

Female (total length 38.0 mm) dark brown, pronotum evenly colored, dorsal and shine spots less distinct. Antennomere IV 2.9 times longer than III (Fig. 5). Tergite VIII (Fig. 27) subtriangular, with base deeply emarginate and sides rounded up to the apex, more sclerotized at middle, clothed with short setae, longer at latero–posterior margins; sternite VIII (Fig. 28) with spiculum 0.7 time total length of sternite, clothed with fine and short setae, longer at lateral and posterior margins. Ovipositor (Figs. 29, 30) long and narrow with paraprocts and proctiger 1.5 times longer than coxites. Coxites without styli, partially membranous, apices irregularly sclerotized, sclerotizations predominantly around strong and elongate setae, baculi 3.7 times longer than coxites; vulva membranous, except for a narrow and longitudinal line. Vagina membranous, widened anteriorly, separate from the bursa copulatrix by a constriction; colleterial glands indistinct; bursa copulatrix with posterior region more sclerotized, spermathecae well sclerotized and spiraled.

Examined material. NEW CALEDONIA. Prov. Sud, Col d' Amieu, 1 male, 30–01–1993, M. Boulard leg. (MZSP); same locality, 1 ex., 08–02–1993 (coll. J. Chassain); Mont Koghi, 1 female 13–02–1990, M. Boulard col (MZSP); Parc Riviere Bleue, 1 male, 19–02–1990, M. Boulard col (Coll. J. Chassain). Lifou, 1 male and 1 female (IRSNB). VANUATU ("New Hebrides"). Fry Coll. 1905–100, Brazier, 1 female (BMNH).

Discussion. Successive attempts to locate the Montrouzier type-material had been unfruitful. For this reason we work with specimens from New Caledonia of sufficient trustworthy identification.

Nycterilampus velutinus Fleutiaux, 1891

(Figs. 1–3, 7, 26)

Nycterilampus velutinus Fleutiaux, 1891: 393, pl. 8, fig. 10a, 10b (type–locality: Lifu Island, Baie de Prony, New Caledonia; Ouarail, Kanala, Bourail); Fauvel, 1904: 133; Schenkling, 1927: 479; Van Zwaluwenburg, 1932: 23.

Redescription. Male (Fig. 1). Length 17.5–19.5 mm; dorsal integument red-brown, darker on pronotal disc and lighter on head; ventral face dark brown with abdomen and inner margin of hypomera light red-brown; antennae testaceous and legs reddish brown. Head length 1.8 mm, prothorax length: 6.0 mm, prothorax width: 4.75 mm, elytral length: 12.2 mm, humeral width: 4.75 mm.

Head. Frons slightly depressed triangularly behind the frontal carina, the latter directed ventrally and strongly rounded at the frontal margin, finely punctate, punctation dense. Frontoclypeal region transverse. Antenna (Fig. 2) 12-segmented, extending up to mid-body, pectinate from antennomere IV; antennomeres II and III very short and subequal, antennomere IV 4.4 times longer than antennomere III; processes on antennomeres IV to X as long as or longer than the corresponding segment, antennomere XI with process distinctly shorter; antennomere XII simple, almost as long as XI including its process. Labrum 2.4 times wider than long. Mandibles with a pit on the external border.

Prothorax (Fig. 7) 1.27 longer than wide, transversally convex, rounded shortly before anterior angles; hind angles elongate, acutely pointed, divergent, strongly carinate, anterior angles small and rounded; base of pronotum steeply declivous, with a median, more or less raised longitudinal short protuberance. Pronotum densely punctate except on the median line, where the punctures are finer and more spaced. Prosternum sparsely punctate, prosternal process subhorizontal feebly incurvate to apex, with a median longitudinal groove. Hypomera shiny and polished on a large area from prosternal sutures, punctate along their external border and bearing a fringe of semidecumbent setae. Scutellum elongate, subpentagonal.

Elytra 2.4 times of pronotal length, parallel on more than their half length, then gradually attenuated and separately rounded before apex, their maximal length near the suture, finely striate up to apex, seventh stria briefly depressed before middle, interstria scarcely convex, finely punctate, epipleura short just exceeding the distal extremity of hind coxal plates.

Mesoventrite with posterior area prominently marginate. Metaventrite with fine and rasp–like punctures; metacoxal plates distinctly widened inwardly, subparallel in their median part and narrowed outwardly.

Abdomen finely punctate, densely pubescent, first sternite evenly and weakly sclerotized. Tergite VIII weakly sclerotized, open U-shaped, subrectilinear at base, bearing on lateral margins a few long setae interspersed with shorter ones. Sternite VIII very feebly sclerotized, deeply bilobate at posterior margins, each lobe very emarginate postero-laterally, the lateral margins of the segment anteriorly bearing on two–thirds of their length very long setae with shorter and finer setae interposed. Tergites IX and X partly fused, tergite IX with anterior margin sinuate; its lateral sides subparallel on anterior part, and then rounded near posterior angles. Tergite X sub-triangularly elongate, with anterior border deeply emarginate. Tergite IX and sternite IX basally fused, the latter with anterior margin sinuate, deeply indented longitudinally, bearing apically a few short setae.

Aedeagus (Fig. 26) with phallobase narrow, parameres shorter than the acuminate median lobe with ventral surface ca. 1.6 times longer than dorsal one, articulated to penis dorsally, apices securiform elongate bearing long setae; ventral sclerite of penis elongate, very narrow, parallel-sided; dorsal sclerite strongly tapering to apex, basal struts 1/3 of total length of dorsal sclerite.

Female (Fig. 7). Length 19–23 mm. Very similar to male in its general appearance. Body elongate, dorsal coloration red–brown; underside red. The dark area of the prothorax reduced to a narrow longitudinal line extending nearly to base. Antenna (Fig. 3) 12-segmented, serrate from antennomere IV, not attaining the apex of pronotal hind angles, segments II and III very short and subequal, antennomere XII elliptically elongate. Elytra with the seventh stria normal, without brief depression before the middle. Hypomera finely punctuate and pubescent on a wider area, the shiny unpunctured portion limited to a narrow strip following prosternal suture.

Lectotype (present designation). Male. NEW CALEDONIA. Kanala, Coll. E. Fleutiaux (MNHN). Paralectotypes. NEW CALEDONIA. 1 male, Ourail, Coll Oberthür, Gambey (MNHN); 1 male, Bourail, Coll Oberthür, Gambey (MNHN); 1 female, Lifu, Coll Oberthür, Gambey (MNHN); 1 female, Bourail, Coll. E. Fleutiaux (MNHN); 1 female, Prony, Coll Oberthür, Gambey (MNHN); without locality. 1 male (MNHN).

Discussion. The present lectotype and paralectotypes designations are based on the examination of six specimens (3 male, 3 female), all recognized as syntypes by C. M. F. von Hayek. A seventh specimen without locality was also examined. In the original description of *N. velutinus* the male was recorded from Lifu (Loyalty Islands), Prony Bay. It is noteworthy that the sole specimen from said locality in the Fleutiaux Collection is a female. However, a male and a female each bear a type label in the same collection, and the male thus labeled will be designated as the lectotype of *N. velutinus* among the other syntypes, all from New Caledonia.

The specimen designated as lectotype has the following labels: (1) Kanala; (2) *Nycterilampus velutinus* male, female, Fleut. types; (3) printed lectotype red label; (4) Fleut. Ann. Soc. Ent. Fr. 1903, p. 393, t8, f.; (5) Bull. Soc. Ent. Fr. 1903, p. 108, Muséum Paris, Coll. E. Fleutiaux; (6) Syntype *Nycterilampus velutinus* Fleut, C. M. F. von Hayek det. 1977; (7) *Nycterilampus velutinus* Fleut. lectotype, J. Chassain det. 2008. The labels of the males designated as paralectotypes are: first specimen - (1) Ourail; (2) prepared aedeagus; (3) Muséum Paris, Oberthür, Gambey - second specimen - (1) Bourail; (2) prepared aedeagus (used for illustration); (3) Muséum Paris, Oberthür, Gambey.

The labels of the females designated as paralectotypes are: first specimen - (1) Lifu; (2) *Nycterilampus velutinus*; (3) *Photophorus lifuanus* Montz. v. minor ?; (4) Muséum Paris, Oberthür, Gambey - second specimen - (1) Bourail; (type female); (3) Muséum Paris, Coll. E. Fleutiaux - third specimen - (1) Prony; (2) Muséum Paris, Oberthür, Gambey. Each paralectotype is provided with respective labels "Syntype, *Nycterilampus velutinus* Fleut., C. M. F. von Hayek det. 1977" and "*Nycterilampus velutinus* Fleut.,

paralectotype, J. Chassain det. 2008", as well as with a printed paralectotype red label.

As noted there above, one specimen showing all characteristics of *N. velutinus* but comprising no mentioned locality has been rightly considered as pertaining to this species by C. M. F. von Hayek, who nevertheless questioned its belonging to the syntype series; we are not designating it here as part of the lectotype series.

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